National Institute of Environmental Health Sciences

Management alternatives to offset climate change effects on Mediterranean fire regimes in NE Spain

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Abstract:

Fire regime is affected by climate and human settlements. In the Mediterranean, the predicted climate change is likely to exacerbate fire prone weather conditions, but the mid- to long-term impact of climate change on fire regime is not easily predictable. A negative feedback via fuel reduction, for instance, might cause a non-linear response of burned area to fire weather. Also, the number of fires escaping initial control could grow dramatically if the fire meteorology is just slightly more severe than what fire brigades are prepared for. Humans can directly influence fire regimes through ignition frequency, fire suppression and land use management. Here we use the fire regime model FIRE LADY to assess the impacts of climate change and local management options on number of fires, burned area, fraction of area burned in large fires and forest area during the twenty-first century in three regions of NE Spain. Our results show that currently fuel-humidity limited regions could suffer a drastic shift of fire regime with an up to 8 fold increase of annual burned area, due to a combination of fuel accumulation and severe fire weather, which would result in a period of unusually large fires. The impact of climate change on fire regime is predicted to be less pronounced in drier areas, with a gradual increase of burned area. Local fire prevention strategies could reduce but not totally offset climate induced changes in fire regimes. According to our model, a combination of restoring the traditional rural mosaic and classical fire prevention would be the most effective strategy, as a lower ignition frequency reduces the number of fires and the creation of agricultural fields in marginal areas reduces their extent.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Other Climate Scenario

Other Climate Scenario: fine fuel moisture content ; drought code;fire weather index

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Temperature

Temperature: Fluctuations

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : Spain

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Intervention: ☑

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content